WHAT IS CLAIMED IS

1. (amended)

A polishing medium for chemical-mechanical polishing, comprising:

an oxidizing agent for a conductor; a protective-film-forming agent for protecting a metal surface; an acid; and water,

not comprising abrasive gains, wherein:

said polishing medium has a pH of 3 or less, and

said oxidizing agent is in a concentration of from 0.01% by weight to 3% by weight.

2. (Amended)

The polishing medium for chemical-mechanical polishing, comprising:

an oxidizing agent for a conductor; a protective-film-forming agent for protecting a metal surface; an acid; water; and abrasive grains;

said abrasive grains are colloidal silica or colloidal alumina,

said abrasive grains have a pH of 3 or less; and said an oxidizing agent is in a concentration of from 0.01% by weight to 3% by weight.

3. The polishing medium for chemical-mechanical polishing according to claim 2, wherein:

said abrasive grains have a average particle diameter of 50 nm or less, and

said abrasive grains have standard deviation of particle size distribution in a value of more than 5 nm.

4. (Canceled)

5. (Canceled)

6. (Canceled)

7. (Canceled)

8. (Amended)

The polishing medium for chemical-mechanical polishing according to claim 2, wherein said abrasive grains are mixed in an amount of from 0.1% by weight to 5% by weight.

9. (Amended)

The polishing medium for chemical-mechanical

polishing according to any one of claims 1 to3 and 8, which further comprises a water-soluble polymer.

10. The polishing medium for chemical-mechanical polishing according to claim 9, wherein said water-soluble polymer is at least one selected from the group consisting of polyacrylic acid, a polyacrylic acid salt, polymethacrylic acid, a polymethacrylic acid salt, polyamic acid, a polyamic acid salt, polyacrylamide, polyvinyl alcohol and polyvinylpyrrolidone.

11. The polishing medium for chemical-mechanical polishing according to claim 9 or 10, wherein said oxidizing agent is in a concentration of from 0.01% by weight to 1.5% by weight.

12. (Amended)

The polishing medium for chemical-mechanical polishing according to any one of claims 1 to 3 and 8 to 11, wherein said acid is an organic acid.

13. The polishing medium for chemical-mechanical polishing according to claim 12, wherein said acid is at least one selected from malonic acid, malic acid,

tartaric acid, glycolic acid and citric acid.

14. (Amended)

The polishing medium for chemical-mechanical polishing according to any one of claims 1 to 3 and 8 to 13, wherein said protective-film-forming agent is at least one selected from benzotriazole and a derivative thereof.

15. (Amended)

The polishing medium for chemical-mechanical polishing according to any one of claims 1 to 3 and 8 to 14, wherein said oxidizing agent for a conductor is at least one selected from hydrogen peroxide, nitric acid, potassium periodate, hypochlorous acid and ozone water.

16. (Amended)

The polishing medium for chemical-mechanical polishing according to any one of claims 1 to 3 and 8 to 15, wherein said conductor contains at lest one of copper, a copper alloy, a copper oxide and a copper alloy oxide.

17. (Amended)

The polishing medium for chemical-mechanical polishing according to any one of claims 1 to 3 and 8 to 15, wherein said conductor is a barrier layer for preventing copper atoms from diffusing.

18. The polishing medium for chemical-mechanical polishing according to claim 17, wherein said barrier layer contains tantalum, a tantalum alloy or a tantalum compound.

19. (Amended)

As polishing condition, polishing pressure is 25 kPa and relative speed of substrate member to polishing platen is 18 m/minute, a polishing medium for chemical-mechanical polishing having:

a polishing-rate ratio (Ta/Cu) between tantalum and copper or a copper alloy of more than 1;

a polishing-rate ratio (TaN/Cu) between tantalum nitride and copper or a copper alloy of more than 1;

a polishing-rate ratio (Ta/SiO_2) between tantalum and silicon dioxide of more than 10; and

a polishing-rate ratio (TaN/SiO_2) between tantalum nitride and silicon dioxide film of more than 10.

20. (Amended)

As polishing condition, polishing pressure is 25 kPa and relative speed of substrate member to polishing platen is 18 m/minute, the polishing medium for chemical-mechanical polishing according to any one of claims 1 to 3 and 8 to 18, which has:

a polishing-rate ratio (Ta/Cu) between tantalum and copper or a copper alloy of more than 1;

a polishing-rate ratio (TaN/Cu) between tantalum nitride and copper or a copper alloy of more than 1;

a polishing-rate ratio (Ta/SiO_2) between tantalum and silicon dioxide of more than 10; and

a polishing-rate ratio (TaN/SiO_2) between tantalum nitride and silicon dioxide film of more than 10.

21. (Amended)

A method of polishing a substrate member comprising a step of polishing a barrier layer containing tantalum, a tantalum alloy or a tantalum compound, by the use of the polishing medium for chemical-mechanical polishing according to any one of claims 1 to 3 and 8 to 19.

22. (Amended)

A method of polishing a substrate member comprising

a step of polishing a surface including a wiring layer and a barrier layer, by the use of the polishing medium for chemical-mechanical polishing according to any one of claims 1 to 3 and 8 to 19.

WHAT IS CLAIMED IS

1. A polishing medium for chemical-mechanical polishing, comprising:

an oxidizing agent for a conductor; a protective-film-forming agent for protecting a metal surface; an acid; and water, wherein:

said polishing medium has a pH of 3 or less, and

said oxidizing agent is in a concentration of from 0.01% by weight to 3% by weight.

2. The polishing medium for chemical-mechanical polishing according to claim 1, which further comprises abrasive grains.

3. The polishing medium for chemical-mechanical polishing according to claim 2, wherein:

said abrasive grains have a average particle diameter of 50 nm or less, and

said abrasive grains have standard deviation of particle size distribution in a value of more than 5 nm.

4. (Canceled)

5. (Canceled)

6. The polishing medium for chemical-mechanical polishing according to any one of claims 2 to 5, wherein;

said abrasive grains are at least one selected from silica, alumina, ceria, titania, zirconia and germania.

7. The polishing medium for chemical-mechanical polishing according to claim 6, wherein said abrasive grains are colloidal silica or colloidal alumina.

8. The polishing medium for chemical-mechanical polishing according to any one of claims 2 to 7, wherein said abrasive grains are mixed in an amount of from 0.1% by weight to 5% by weight.

9. The polishing medium for chemical-mechanical polishing according to any one of claims 1 to 8, which further comprises a water-soluble polymer.

10. The polishing medium for chemical-mechanical polishing according to claim 9, wherein said water-soluble polymer is at least one selected from the group consisting of polyacrylic acid, a polyacrylic acid salt,

polymethacrylic acid, a polymethacrylic acid salt, polyamic acid, a polyamic acid salt, polyacrylamide, polyvinyl alcohol and polyvinylpyrrolidone.

11. The polishing medium for chemical-mechanical polishing according to claim 9 or 10, wherein said oxidizing agent is in a concentration of from 0.01% by weight to 1.5% by weight.

12. The polishing medium for chemical-mechanical polishing according to any one of claims 1 to 11, wherein said acid is an organic acid.

13. The polishing medium for chemical-mechanical polishing according to claim 12, wherein said acid is at least one selected from malonic acid, malic acid, tartaric acid, glycolic acid and citric acid.

14. The polishing medium for chemical-mechanical polishing according to any one of claims 1 to 13, wherein said protective-film-forming agent is at least one selected from benzotriazole and a derivative thereof.

15. The polishing medium for chemical-mechanical

polishing according to any one of claims 1 to 14, wherein said oxidizing agent for a conductor is at least one selected from hydrogen peroxide, nitric acid, potassium periodate, hypochlorous acid and ozone water.

16. The polishing medium for chemical-mechanical polishing according to any one of claims 1 to 15, wherein said conductor contains at lest one of copper, a copper alloy, a copper oxide and a copper alloy oxide.

17. The polishing medium for chemical-mechanical polishing according to any one of claims 1 to 15, wherein said conductor is a barrier layer for preventing copper atoms from diffusing.

18. The polishing medium for chemical-mechanical polishing according to claim 17, wherein said barrier layer contains tantalum, a tantalum alloy or a tantalum compound.

19. A polishing medium for chemical-mechanical polishing having:

a polishing-rate ratio (Ta/Cu) between tantalum and copper or a copper alloy of more than 1;

a polishing-rate ratio (TaN/Cu) between tantalum nitride and copper or a copper alloy of more than 1;

a polishing-rate ratio (Ta/SiO_2) between tantalum and silicon dioxide of more than 10; and

a polishing-rate ratio (TaN/SiO_2) between tantalum nitride and silicon dioxide film of more than 10.

20. The polishing medium for chemical-mechanical polishing according to any one of claims 1 to 18, which has:

a polishing-rate ratio (Ta/Cu) between tantalum and copper or a copper alloy of more than 1;

a polishing-rate ratio (TaN/Cu) between tantalum nitride and copper or a copper alloy of more than 1;

a polishing-rate ratio (Ta/SiO_2) between tantalum and silicon dioxide of more than 10; and

a polishing-rate ratio (TaN/SiO_2) between tantalum nitride and silicon dioxide film of more than 10.

21. A method of polishing a substrate member comprising a step of polishing a barrier layer containing tantalum, a tantalum alloy or a tantalum compound, by the use of the polishing medium for chemical-mechanical polishing according to any one of claims 1 to 19.

22. A method of polishing a substrate member comprising a step of polishing a surface including a wiring layer and a barrier layer, by the use of the polishing medium for chemical-mechanical polishing according to any one of claims 1 to 19.

Amendment under Article 34

Applicant made the Amendments under PCT Article 34 as follows, which was filed on August 10, 2001.

In the Specification

1. Page 29, line 15, amend "250 gf/cm^2." to "25 kPa/ cm^2 (250 gf/cm^2)".

In the Claims

2. Page 36, claim 1, line 5, add "not comprising abrasive gains," after "and water,".
3. Page 36, claim 2, amend "The polishing medium for chemical-mechanical polishing according to claim 1, which further comprises abrasive grains." to "The polishing medium for chemical-mechanical polishing, comprising: an oxidizing agent for a conductor; a protective-film-forming agent for protecting a metal surface; an acid; water; and abrasive grains; said abrasive grains are colloidal silica or colloidal alumina, said abrasive grains have a pH of 3 or less; and said an oxidizing agent is in a concentration of from 0.01% by weight to 3% by weight. ".
4. Please cancel Claim 6 and 7.
5. Page 38, claim 8, line 2, amend "according to any one of claims 2 to 7 " to "according to claim 2".
6. Page 38, claim 9, line 2, amend "according to any one of claims 1 to 8" to "according to any one of claims 1 to 3 and 8".
7. Page 39, claim 12, line 2, amend "according to any one of claims 1 to 11" to "according to any one of claims 1 to 3 and 8 to 11".
8. Page 39, claim 14, line 2, amend "according to any one of claims 1 to 13" to "according to any one of claims 1 to 3 and 8 to 13".
9. Page 39, claim 15, line 2, amend "according to any one of claims 1 to 14" to "according to any one of claims 1 to 3 and 8 to 14".
10. Page 39, claim 16, line 2, amend "according to any one of claims 1 to 15" to "according to any one of claims 1

to 3 and 8 to 15".

11. Page 40, claim 17, line 2, amend "according to any one of claims 1 to 15" to "according to any one of claims 1 to 3 and 8 to 15".

12. Page 40, claim 19, line 1, add "As polishing condition, polishing pressure is 25 kPa and relative speed of substrate member to polishing platen is 18 m/minute," before "A polishing medium for chemical-mechanical polishing having:…".

13. Page 40, claim 20, line 1, add "As polishing condition, polishing pressure is 25 kPa and relative speed of substrate member to polishing platen is 18 m/minute," before "A polishing medium for chemical-mechanical polishing according …".

14. Page 40, claim 20, line 2, amend "according to any one of claims 1 to 18" to "according to any one of claims 1 to 3 and 8 to 18".

15. Page 41, claim 21, line 5, amend "according to any one of claims 1 to 19" to "according to any one of claims 1 to 3 and 8 to 19".

16. Page 41, claim 22, line 5, amend "according to any one of claims 1 to 19" to "according to any one of claims 1 to 3 and 8 to 19".